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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,304	01/17/2006	Beom-Seok Cho	21C-0296	3708
23413	7590	05/07/2007		
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			EXAMINER CRUZ, LESLIE PILAR	
			ART UNIT	PAPER NUMBER
			2826	
			MAIL DATE	DELIVERY MODE
			05/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/535,304	Applicant(s) CHO ET AL.	
	Examiner Leslie P. Cruz	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 6-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Minhloan Tran
Minhloan Tran
Primary Examiner
Art Unit 2826

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgements

The amendment filed on 16 February 2007 in response to the Office Action mailed on 30 November has been entered. The present Office Action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office Action are claims 1-16.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,686,661 B1), hereinafter Lee, in view of Cabral, JR et al. (US 2002/0076574 A1), hereinafter Cabral, JR.

With respect to claim 1, Lee (e.g. Figs. 3, 4, 6A, 6B) discloses a TFT substrate for an LCD apparatus comprising: a silicon-containing substrate [1]; a diffusion barrier layer [201] formed on the substrate; and a copper alloy layer [200] formed on the diffusion barrier layer formed on the substrate. Lee does not disclose that the copper alloy layer includes a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer. However, Cabral, JR (e.g. Figs. 4, 5A, 5B) discloses that it is well known for a copper alloy layer [16] to include a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier

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[24] layer [paragraphs 0014, 0015 and 0045]. Cabral, JR teaches that it is beneficial for the copper alloy layer to include a material from about 0.5at% to about 15at%, which is used to form the diffusion barrier layer in order to improve electromigration resistance and improve adhesion to the diffusion barrier layer [paragraphs 0007 and 0033].

With respect to claim 3, Lee in view of Cabral, JR discloses the TFT substrate of claim 1. Lee does not specify that the thickness of the diffusion barrier layer is from about 50Å to about 5000Å. It is known in the art that the thickness of the diffusion barrier layer being from about 50Å to about 5000Å is beneficial because the thickness will properly ensure the diffusion barrier property of the diffusion barrier layer and substantially eliminate oxidation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the diffusion barrier layer of Lee in view of Cabral, JR to have a thickness from about 50Å to about 5000Å to substantially eliminate oxidation as it is well known in the art. The specific claimed relative thicknesses of the diffusion barrier layer, absent any criticality, are only considered to be the "optimum" thicknesses that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired adhesive strength, manufacturing costs, etc. (see Boesch, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, *i.e.*, results which are different in kind and not in degree from the results of the prior art, will be obtained.

Accordingly, since the applicants have not established the criticality (see next paragraph below) of the stated relative thicknesses, it would have been obvious to one of ordinary skill in the art to use these values in the device of Lee in view of Cabral, JR.

The specification contains no disclosure of either the critical nature of the claimed dimensions or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With respect to claim 4, Lee in view of Cabral, JR discloses the TFT substrate of claim 1. Lee further discloses the copper alloy layer is a metal layer corresponding to a gate line [column 1 lines 11-14].

With respect to claim 5, Lee in view of Cabral, JR discloses the TFT substrate of claim 1. Lee further discloses the silicon containing substrate is a silicon substrate [column 2 line 21].

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Cabral, JR as applied to claim 1 above, and further in view of Farrar (US 2002/0182858 A1).

With respect to claim 2, Lee in view of Cabral, JR discloses the TFT substrate of claim 1. Lee specifies that the diffusion barrier layer comprises Ti but does not specify that the diffusion barrier layer is a silicide compound. However, paragraph 0038 of Farrar teaches that it is well-known for a diffusion barrier layer to comprise a silicide compound including at least Ti. It is known in the art that a silicide compound including at least Ti are beneficial as diffusion barrier layers because it improves adhesion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the diffusion barrier layer of Lee in view of Cabral, JR to comprise a silicide compound including at least Ti as suggested by Farrar because it improves adhesion as it is well known in the art.

Response to Arguments

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Telephone/Fax Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie P. Cruz whose telephone number is 571-272-8599. The examiner can normally be reached on Monday-Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Sue A. Purvis and Robert Pascal can be reached on 571-272-1236 and (571) 272-1769, respectively. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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